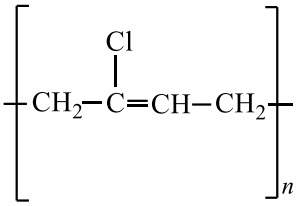
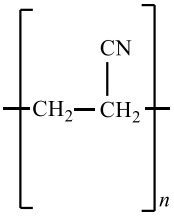
POLYMERS

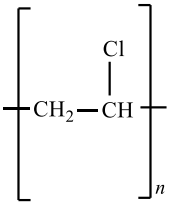
CHEMISTRY

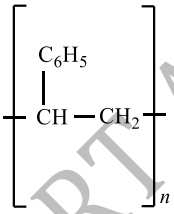
Single Correct Answer Type

1. A chain transfer agent is
   a) C_6H_5OH b) $NH(C_6H_5)_2$
   c) CCl_4 d) CH_3OH
2. Caprolactam is obtained from
   a) Cyclohexane b) Hexane
   c) Adipic acid d) Adipic acid and hexamethylene diamine
3. Caprolactam is used to prepare which of the following polymer?
   a) Nylon-6, 6 b) Malamine c) Nylon-6 d) PMMA
4. Which of the following represents neoprene polymer:

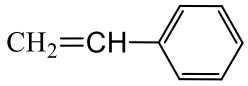
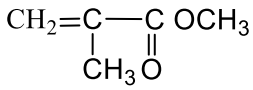
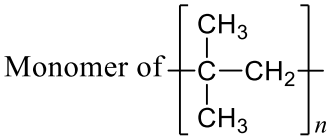
   a) 

   b) 

   c) 

   d) 

5. Among cellulose poly (vinyl chloride), nylon and natural rubber, the polymer in which the intermolecular force of attraction is weakest in
   a) Nylon b) Poly (vinyl chloride) c) Cellulose d) Natural rubber
6. A homopolymer is obtained by polymerization of:
   a) One type of monomer units
   b) Two types of monomer units
   c) Either of the above
   d) None of the above
7. For natural polymers PDI is generally
   a) 0 b) 1 c) 100 d) 1000
8. Which is fully fluorinated polymer?
   a) Neoprene b) Teflon c) Thiokol d) PVC

9. Which is not true about polymers?
   a) Polymers have high viscosity
   b) Polymers scatter light
   c) Polymers do not carry any charge
   d) Polymers have low molecular weight
10. From the given statements, which one is not true?
   a) Teflon is a macromolecule
   b) Teflon is a polymer
   c) Polythene is a polymer
   d) Chlorophyll is a polymer
11. Head-to-tail addition takes place in chain-growth polymerization when monomer is
   a) 
   b) $CH_2 = CH - CH = CH_2$
   c) 
   d) $CH_2 = CH - C \equiv N$
12. Which pair of polymers have similar properties?
   a) Nylon, PVC
   b) PAN, PTFE
   c) PCTFE, PTFE
   d) Bakelite, alkyl resin
13. With increase in which of the following factors, tensile strength of a polymer increases?
   a) Crystallinity
   b) Melting point
   c) Molecular weight
   d) All of these
14. Monomer of  is
   a) 2- methylpropene
   b) Styrene
   c) Propylene
   d) Ethane
15. Acetate rayon is prepared from:
   a) Acetic acid
   b) Glycerol
   c) Starch
   d) Cellulose
16. Low density polythene is prepared by
   a) Free radical polymerization
   b) Cationic polymerization
   c) Anionic polymerization
   d) Ziegler-Natta polymerization
17. Which one among the following is a thermosetting plastic?
   a) PVC
   b) PVA
   c) Bakelite
   d) None of these
18. The condensation polymer among the following is
   a) Rubber
   b) Protein
   c) PVC
   d) Polythene
19. Natural rubber is a polymer of:
   a) *trans*-isoprene
   b) *cis*-isoprene
   c) *cis*-and *trans*-isoprene
   d) None of these
20. Which of the following is a natural polymer?
   a) Polythene
   b) polysaccharides
   c) Nylon
   d) Terylene
21. Polymer obtained by condensation polymerisation is:
   a) Polythene
   b) Teflon
   c) PVC
   d) Nylon-6, 6
22. Which of the following elements is present in Teflon?
   a) Fluorine
   b) Chlorine
   c) Bromine
   d) Iodine
23. Which of the following is a condensation polymer?
   a) Polystyrene
   b) Neoprene
   c) PAN
   d) Polyethylene terephthalate
24. Dacron is an example of
   a) Polyester
   b) Polyurethane
   c) Polyamide
   d) Polypropylene
25. A copolymer of isobutylene and isoprene is called:
   a) Butyl rubber
   b) Buna-S
   c) Buna-N
   d) Thiokol
26. Which of the following is an example of condensation homopolymer?

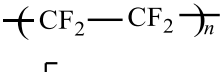
a) Alkyd resin b) Bakelite c) Perlon d) Malmac

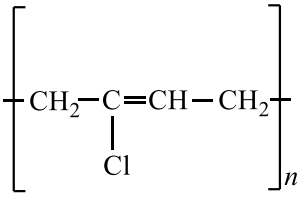
27. Which of the following is not a cellulose product?
a) Gun cotton b) Celluloid c) Rayon d) Dacron

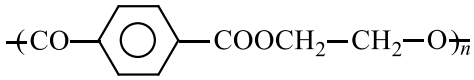
28. Which of the following is currently used as a true cord?
a) Polyethylene b) Polypropylene c) Bakelite d) Nylon-6

29. Structures of some common polymers are given. Which one is not correctly presented?

a) Nylon-6,6


b) Teflon 

c) Neoprene 

d) Terylene


30. Which is the best monomer for getting chain growth polymer?
a) $CH_2 = CHCI$ b) $CH_2 = CHCN$ c) $CH_2 = CHC_6H_5$ d) $CH_2 = C.COOCH_3$

31. Which of the following is thermoplastic?
a) Dacron b) Nylon c) Polythene d) All of these

32. Thermosetting polymer,Bakelite is formed by the reaction of phenol with
a) CH_3CH_2CHO b) CH_3CHO c) HCHO d) HCOOH

33. Which one of the following statement is wrong?
a) The IUPAC name of $[Co(NH_3)_6Cl_3]$ is hexamine cobalt III chloride.
b) Dibenzol peroxide is a catalyst in the polymerization of PVC.
c) Borosilicate glass is heat resistant.
d) Concentrated HNO_3 can be safely transported in aluminium containers.

34. Symbolic name for Teflon is:
a) PTFE b) PCTFE c) PVC d) None of these

35. The condensation polymer is
a) Teflon b) Polystyrene c) Dacron d) Neoprene

36. Which of the following is not an addition polymer?
a) Neoprene b) Polystyrene c) Terylene d) Polyethylene

37. Which of the following pairs is not correctly matched?
a) Terylene-condensation polymer of terephthalic acid and ethylene glycol
b) Teflon-thermally stable cross linked polymer of phenol and formaldehyde
c) Perspex-a homopolymer of methyl methacrylate
d) Synthetic rubber-a copolymer of butadiene and styrene

38. Which among the following is step-growth polymer?
a) PTFE b) PVC c) Polyester d) Polythene

39. Which one of the following is not a condensation polymer?
a) Dacron b) Neoprene c) Melamine d) Glyptal

40. Teflon is:
a) $-(CBr_2-CBr_2)_n-$ b) $-(CCl_2-CCl_2)_n-$ c) $-(CBr_2-CBr_2)_n-$ d) CF_2Cl_2

41. An example of natural biopolymer is
a) Teflon b) Nylon-66 c) Rubber d) DNA

42. A polymer containing nitrogen is
a) Bakelite b) Dacron c) Rubber d) Nylon-66

43. Which of the following has been used in the manufacture of non-inflammable photographic films?
    a) Cellulose nitrate
    b) Cellulose xanthate
    c) Cellulose perchlorate
    d) Cellulose acetate
44. Arrange the following monomers in order of decreasing ability to undergo cationic polymerisation
    I. $NO_2C_6H_5 - CH = CH_2$
    II. $CH_2 = CH - C_6H_5CH_3$
    III. $CH_2 = CH - C_6H_5OCH_3$
    a) I>II>III
    b) III>II>I
    c) II>I>III
    d) I>III>II
45. Which of the following alkenes is most reactive towards cationic polymerization?
    a) $CH_2 = CHCH_3$
    b) $H_2C = CHCl$
    c) $H_2C = CHC_6H_5$
    d) $H_2C = CHCO_2CH_3$
46. The product of addition polymerisation reaction is:
    a) PVC
    b) Nylon
    c) Terylene
    d) Polyamide
47. The polymer obtained by condensation of sebacic acid and hexamethylenediamine is named as
    a) Nylon-6
    b) Nylon-6-nylon-10
    c) Nylon-6,6
    d) Nylon-6,10
48. Among the following, the wrong statement is
    a) PMMA is plexiglass
    b) SBR is natural rubber
    c) PTFE is teflon
    d) LDPE is low density polythene
49. Natural rubber is which type of polymer?
    a) Condensation polymer
    b) Addition polymer
    c) Coordination polymer
    d) None of these
50. PVC polymer can be prepared by which of the moment?
    a) $CH_3CH = CH_2$
    b) $C_6H_5CH = CH_2$
    c) $CH_2 = CH_2$
    d) $CH_2 = CH — Cl$
51. Which of the following is polycarbonate?
    a) Acrilan
    b) Lexan
    c) NBR
    d) Runa-S
52. Which of the following has an ester linkage?
    a) Nylon-6, 6
    b) Dacron
    c) PVC
    d) Bakelite
53. On the basis of their mode of formation, the polymers can be classified as
    a) Addition polymers only
    b) Condensation polymers only
    c) Copolymers
    d) Both addition and condensation polymers
54. Thermoplastics are:
    a) Linear polymers
    b) Soften or melt on heating
    c) Molten polymer can be moulded in desired shape
    d) All of the above
55. The starting materials of PCTFE are:
    a) Monochlorotrifluoro ethylene
    b) Tetrafluoroethylene
    c) Vinyl chloride
    d) Styrene
56. Nylon is not a
    a) Condensation polymer
    b) Polyamide
    c) Copolymer
    d) Homopolymer
57. Thiokol is a
    a) fibre
    b) Plastic
    c) Rubber
    d) Monomer
58. Terylene is a polymer obtained from
    a) Ethylene glycol and glycerol
    b) Ethylene glycol and glyceraldehydes
    c) Ethylene glycol and terephthalic acid
    d) None of the above
59. Which are true for terpolymer?
    a) Contains three monomers
    b) ABS plastic
    c) A polymer of acrylonitrile, butadiene and styrene

d) All of the above

60. Protein is a polymer of:
    a) Glucose b) Terephthalic acid c) Amino acids d) None of these
61. Orlon is a polymer of:
    a) Styrene b) Acrylonitrile c) Vinyl chloride d) Tetrafluoroethylene
62. Monomer of PTFE is
    a) Ethylene b) Propylene c) Butadiene d) Tetra fluoroethylene
63. Rubber is heated with Sulphur and the process is known:
    a) Galvanization b) Vulcanization c) Bessemerization d) Sulphonation
64. Which one of the following is a copolymer?
    a) Polyethylene b) Polyvinyl chloride
    c) Polytetrafluoroethylene d) Nylon-6, 6
65. Given the polymers,
    A = Nylon 6.6; B=Buna –S; C= Polythene. Arrange these in increasing order of their intermolecular force (lower to higher).
    a) $A < B < C$ b) $A < C < B$ c) $B < C < A$ d) $B < C < B$
66. Rayon is
    a) Natural silk b) Artificial silk c) Regenerated fibre d) Synthetic fibre
67. Heating of rubber with sulphur is called
    a) Vulcanisation b) Galvanisation c) Sulphonation d) Bessemerisation
68. Nylon-66 is not a
    a) Condensation polymer b) Polyamide
    c) Both (a) and (b) d) None of the above
69. Which of the following is fully fluorinated polymer?
    a) PVC b) Thiokol c) Teflon d) Neoprene
70. Vulcanised rubber resists
    a) Wear and tear due to friction b) High temperature
    c) Action of heat d) Cryogenic temperature
71. Perspex or plexiglass is a polymer of:
    a) Methyl methyl acrylate
    b) Methyl acrylate
    c) Acrylonitrile
    d) None of the above
72. The weakest interparticle forces of attraction are present in
    a) Elastomers b) Fibres
    c) Thermoplastics d) Thermosetting polymers
73. If M_w is the weight average molecular weight and $\bar{M}_n$ is the number of average molecular weight of a polymer, the poly dispersity index (PDI) of the polymer is given by
    a) $\frac{\bar{M}_n}{M_w}$ b) $\frac{\bar{M}_w}{M_n}$ c) $\bar{M}_w \times \bar{M}_n$ d) $\frac{1}{\bar{M}_w \times \bar{M}_n}$
74. The polymer, which is a product of addition polymerization, is
    a) Glyptal b) Buna rubber c) Proteins d) Nylon-6, 6
75. Buna rubber is a polymer of:
    a) 1,3-butadiene b) Vinyl acetate c) Styrene d) None of these
76. Condensation product of caprolactum is
    a) Nylon-6 b) Nylon-66 c) Nylon-60 d) Nylon-6,10
77. To make PVC a flexible plastic, the additive used is called:
    a) Filler b) Antioxidant c) Stabilizer d) Plasticiser
78. Nylons, polyesters and cotton, all possess strength due to:
    a) Intermolecule H-bonding

b) Van der Waals' attraction
c) Dipole-dipole interaction
d) None of the above

79. Natural rubber on catalytic hydrogenation gives
a) Syndiotactic product b) Atactic product c) Isotactic product d) None of these

80. Nylon-66 is an example of
a) Poly propylene b) Polyester c) Polyamide d) Polystyrene

81. Natural rubber is a polymer of
a) Styrene b) Chloroprene
$CH_2 = C - CH = CH_2$ or isoprene d) 1,3 butadiene
c) $\begin{array}{l} \\ | \\ CH_3 \end{array}$

82. Bakelite is a copolymer of:
a) HCHO and melamine b) HCHO and phenol c) Phenol and ethylene d) None of these

83. Which can absorb over 90% of its own mass of water and does not stick to wound?
a) Rayon b) Gun cotton c) Thiokol d) Saran

84. Terylene is a:
a) Polyamide
b) Polyester
c) Polyether
d) Long chain hydrocarbon

85. Caprolactam used for manufacture of nulon-6 is obtained by Beckmann rearrangement of
a) Benzophenone oxime b) Acetophenone oxime
c) Cyclohexanone oxime d) Cyclopentanone oxime

86. Which type of polymer is cellulose diacetatefibre?
a) Synthetic b) Natural c) Semi-synthetic d) None of these

87. Which of the following is not a natural polymer?
a) Glycogen b) Cellulose c) Pepsin d) Polybutadiene

88. Polyethylene is a resin obtained by polymerization of
a) Styrene b) Isoprene c) Ethylene d) Butadiene

89. Polymers have
a) Absolute molecular weight b) Average molecular weight
c) Low molecular weight d) Absolute melting point

90. PDI for natural polymers is generally close to:
a) Zero b) 100 c) 1 d) 10

91. Which is a polymer of three different monomers?
a) ABS b) SBR c) NBR d) Nylon-2-nylon-6

92. Which one of the following is a copolymer?
a) Saran b) Orlon c) PVC d) Teflon

93. Which of the following cannot be grouped as polyolefins?
a) Polyethene b) Polypropene c) Polystyrene d) Polyoxyethene

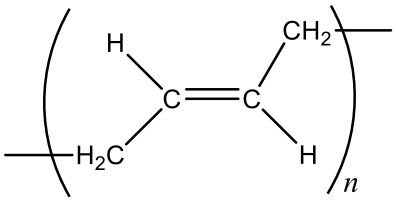
94. Consider following statements
IV. Cationic polymerization occurs in monomers with electron donation substitutents.
V. Anionic polymerization occurs in monomers with electron-withdrawing substitutents.
VI. Head-to-head chain growth polymerisation occurs in polystyrene
Select correct statements
a) I,II b) I,III c) II,III d) I,II,III

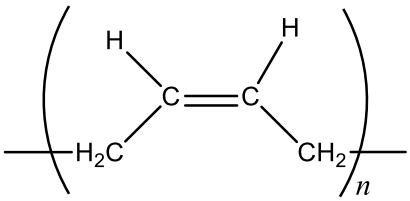
95. Of the following which is a step growth polymer?
a) Bakelite b) Polyethylene c) Teflon d) PVC

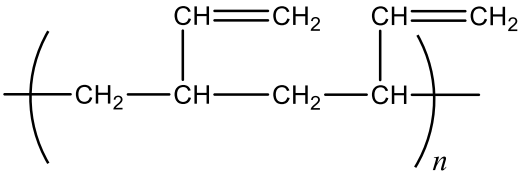
96. Chloroprene is obtained by addition of HCI to
a) Ethylene

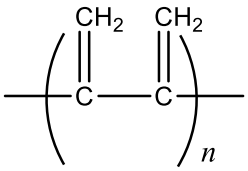
b) Acetylene
c) Vinylacetylene
d) Phenyl acetylene

97. Mark out the most unlike form of polymerization of $CH_2 = CH - CH = CH_2$

a) 

b) 

c) 

d) 

98. Which of the following vinyl derivatives is most reactive towards anionic polymerisation?
a) $CH_2 = CHCH_3$ b) $CH_2 = CHC_2H_5$ c) $CH_2 = CHCI$ d) $CH_2 = CHC = N$

99. Which of the following rubber is not a polydiene?
a) Polyisoprene b) Polychloroprene c) Thiokol rubber d) Nitrile rubber

100. The S in Buna-S refers to
a) Sulphur b) Styrene c) Sodium d) Just a trade name

101. In case of condensation of polymers?
a) High molecular weight polymers are formed all at once.
b) Lower molecular weight polymers are formed all at once.
c) Molecular weight of polymers rises throughout the reaction.
d) Have no specific relation to their molecular weight.

102. Synthetic polymer which resembles natural rubber is
a) Neoprene b) Chloroprene c) Glyptal d) Nylon

103. Which one of the following is employed in making explosives?
a) Methanol b) Oxalic acid c) Glycerol d) Urea

104. Which of the following is biodegradable polymer?
a) Polythene b) Bakelite c) PHBV d) PVC

105. Polymers of the type $X - M_n - Y$ are called
a) Telomers b) Copolymers c) Elastomers d) Invertomers

106. A copolymer of vinyl chloride and vinyledene chloride is called:
a) Dynel b) Saran c) Vinylon d) Orlon

107. Which of the following is commonly called a "polyamide"?
a) Rayon b) Nylon-6,6 c) Terylene d) Orlon

108. Melamine plastic crockery is a copolymer of:
a) HCHO and melamine
b) HCHO and ethylene
c) Melamine and ethylene
d) None of these

109. Which of the following type of forces are present in nylon-6, 6?
a) Van der walls" forces of attraction b) Hydrogen bonding
c) Three dimensional network of bonds d) Metallic bonding

110. Which of the following is an inert polymer used in coting, particularly in non-sticking frying pans?
a) Teflon b) Perspex c) Bakelite d) Orlon

111. Which of the following is wrong?
a) PMMA is called plexiglass
b) PTFE is called Teflon

c) SBR is called natural rubber
d) LDPE is called low density polyethylene

112. Which of the following is called polyamide?
a) Terylene b) Rayon c) Nylon d) Orlon

113. Teflon is an example of polymer which is a/an
a) Polyamide b) Addition polymer c) Polyester d) Formaldehyde resin

114. Bakelite is:
a) Addition polymer b) Elastomer c) Thermoplastic d) Thermosetting

115. Formation of terylene is an example of
a) Condensation polymerization b) Addition polymerization
c) Esterification d) Saponification

116. Natural rubber is polymer of

a) $H_2C = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH = CH_2$

b) $H_2C = \underset{\displaystyle Cl}{\underset{|}{C}} - CH = CH_2$

c) $\underset{\displaystyle C_6H_5}{\underset{|}{}}$
$CH = CH_2$

d) $-\!\!\left(CH_2-CH_2\right)_n-\!\!-$

117. Which of the following is an elastomer?
a) Vulcanised rubber b) Dacron c) Polystyrene d) Melamine

118. The correct repeating structural unit of polystyrene is

a) $-CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-CH_2-$

b) $-CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-$

c) $-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-CH_2-CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-$

d) $-CH_2-\underset{\displaystyle C_6H_5}{\underset{|}{CH}}-CH_2-CH=CH-CH_2-$

119. Which of the following is used for making artificial silk?
a) Adipic acid b) Starch c) Cellulose d) Terephthalic acid

120. $F_2C = CF_2$ is a monomer is
a) Teflon b) Nylon c) Glyptal d) Buna-S

121. Which is/are true for elastomers?
a) These are synthetic polymers possessing elasticity
b) These possess very weak intermolecular forces of attractions between polymer chains
c) Vulcanis ed rubber is an example of elastomer
d) All of the above

122. Which of the following is a biodegradable polymer?
a) Cellulose b) PVC c) Nylon-6 d) Polythene

123. The compound which cannot be used as a plasticizer, is
a) di-n-butylphthalate b) Tricresyl phosphate
c) di-n-octyphthalate d) Diethyl phthalate

124. The monomer or Teflon is
a) Monofluoroethene b) Difluoroethene c) Trifluoroethene d) Tetrafluoroethene

125. Which of the following does not cause pollution?
a) Burning of rubber b) Burning of petrol c) Use of solar energy d) Coal

126. Polystyrene, Dacron and orlon are classified respectively as
a) Chain growth; step growth; step growth b) Chain growth; chain growth; step growth
c) Chain growth; step-growth; chain growth d) Step growth; step growth; chain growth

127. Catalyst used in dimerisation of acetylene to 'prepare' chloroprene is
a) $HgSO_4 + H_2SO_4$ b) Cu_2Cl_2 c) $Cu_2Cl_2 + NH_4Cl$ d) $Cu_2Cl_2 + NH_4OH$

128. The fibre obtained by the condensation of hexamethylene diamine and adipic acid is:
a) Dacron b) Nylon-6,6 c) Rayon d) Teflon
129. Caprolactam can be obtained from:
a) Benzaldehyde b) Cyclohexane c) Benzophenone d) Adipic acid
130. Polystyrene is an example of
a) Elastomer b) Fibre
c) Thermoplastic d) Thermosetting polymer
131. The catalyst used in the manufacture of polythene by Ziegler method is:
a) Titanium tetrachloride and triphenyl aluminium
b) Titanium tetrachloride and triethyl aluminium
c) Titanium dioxide
d) Titanium isoperoxide
132. The compound used in the manufacture of Terylene is:
a) Phthalic acid
b) Caprolactam
c) p-benzene dicarboxylic acid
d) m-phthalic acid
133. Which is not a polyacrylate?
a) PMMA b) Acrilan c) Poly acrylonitrile d) PCTFE
134. Which one of the following is not a correct match?

Polymer		Monomer/s			
a) Teflon	-	Tetrafluroethylene	b) Plexi glass	-	Methyl methacrylate
c) Orlon	-	Glycerol,phthalic anhydride	d) Buna S	-	Styrene,1,3 butadiene

135. The catalyst used in the polymerization of high density polythene is
a) Titanium oxide
b) Titanium isoperoxide
c) Lithium tetrachloride and triphenyl aluminium
d) Titanium tetrachloride and trimethyl aluminium
136. The alternative name of glyptal is
a) Alkyd resin b) Phenol-formaldehyde resin
c) Melamine- formaldehyde resin d) Melmac
137. Synthetic polymer that resembles natural rubber is
a) Chloroprene b) Isoprene c) Neoprene d) Glyptal
138. The phenomenon involving the union of two or more molecules to form a new molecular aggregate is called:
a) Polarisation b) Polymerisation c) Photosensitisation d) Pasteurisation
139. By the addition of 3% to 10% sulphur in rubber
a) Soft rubber is obtained b) Hard rubber is obtained
c) No change takes place d) Soluble rubber is obtained
140. Of the following which one is classified as polyster polymer?
a) Nylon-6,6 b) Terylene c) Bakelite d) Melarnive
141. The simple molecules from which a polymer is made, are called
a) Monomer b) Repeating unit c) Isomer d) Tautomer
142. Dacron is obtained by the condensation polymerization of
a) Dimethyl terephthalate and ethylene glycol b) Terephthalic acid and formaldehyde
c) Phenol and phthalic acid d) Phenol and formaldehyde
143. Buna-S is a copolymer of
a) Styrene and 1, 3-butadiene b) Styrene and ethylene
c) 1,3-butadiene and ethylene d) None of the above
144. Which of the following is not a synthetic fibre?
a) Rubber b) Nylon-6 c) Nylon-6, 6 d) Nylon-6,10

145. Which of the following statement is false?
   a) The repeat unit in natural rubber is isoprene
   b) Both starch and cellulose are polymers of glucose
   c) Artificial silk is derived from cellulose
   d) Nylon-6,6 is an example of elastomer

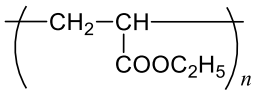
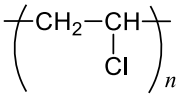
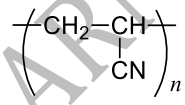
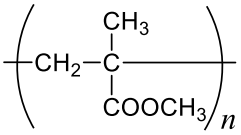
146. Which is considered to be the first synthetic polymer?
   a) Nylon b) Terylene c) LDPE d) Bakelite

147. Which one of the following is a chain growth polymer?
   a) Starch b) Nucleic acid c) Polystyrene d) Protein

148. Number average molecular mass, $\overline{M_n}$ and weight average molecular mass $(\overline{M}_w)$ of synthetic polymers are related as
   a) $\bar{M}_n = (\overline{M_w})^{1/2}$ b) $\bar{M}_n = \bar{M}_w$ c) $\bar{M}_w > \bar{M}_n$ d) $\bar{M}_w < \bar{M}_n$

149. Which is not an example of copolymer?
   a) SAN b) ABS c) Saran d) PVC

150. Gutta parcha rubber is:
   a) a *trans*-1, 4-polyisoprene polymer
   b) A very hard material
   c) A synthetic polymer
   d) All of the above

151. Orlon is a hard, horny and a high melting material, which of the following represents its structure?
   a)  b)  c)  d) 

152. Which of the following is used in vulcanization of rubber?
   a) SF_6 b) CF_4 c) Cl_2F_2 d) C_2F_2

153. Which of the following natural products is not a polymer?
   a) DNA b) Cellulose c) ATP d) Urease

154. Buna –N- synthetic rubber is a copolymer of
   a) $H_2C = CH - \underset{\displaystyle Cl}{\underset{|}{C}} = CH_2$ and $H_2C = CH - CH = CH_2$
   b) $H_2C = CH - CH = CH_2$ and $H_5C_6 - CH = CH_2$
   c) $H_2C = CH - CN$ and $H_2C = CH - CH = CH_2$
   d) $H_2C = CH - CN$ and $H_2C - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH_2$

155. Wsterification of terephthalic acid with glycol produces
   a) Nylon b) Buna rubber c) Polyurethane d) Terylene

156. Which compound polymerises of neoprene?
   a) $CH_2 = CHCl$ b) $CH_2 = C.Cl - CH = CH_2$
   c) $Cl_2C = C.Cl_2$ d) $F_2C = CF_2$

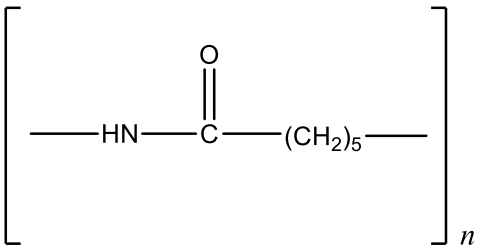
157. Which of the following is not a thermoset?
   a) Glyptal
   b) Bakelite
   c) Melamine-formaldehyde polymer
   d) Styrene-butadiene rubber

158. Monomers are converted to polymer by
   a) Hydrolysis of monomers b) Condensation reaction between monomers
   c) Protonation of monomers d) None of the above

159. Glyptal polymer is obtained from glycol by reacting with

a) Malonic acid b) Phthalic acid c) Maleic acid d) Terephthalic acid

160. Nylon is manufactured from
a) Methyl salicylate b) Teflon c) Adipic acid d) Ethylene

161. Which of the following is a condensation polymer?
a)  b) Rubber
c) Polyvinyl chloride d) Polyethylene

162. Bakelite is a condensation polymer of phenol and formaldehyde. The initial step between the two compounds is an example of
a) Free radical reaction b) Aldol condensation
c) Aromatic nucleophilic substitution d) Aromatic electrophilic substitution

163. Name of compound/compounds used in preparation of nylon-66
a) $\varepsilon -$ caprolactum b) Hexamethylenediamine and adipic acid
c) Dimethyl terephthalate d) Hexamethylenediamine

164. Phenol-formaldehyde resins are obtained from phenol and formaldehyde by
a) Addition polymerization b) Condensation polymerization
c) Copolymerization d) Both(b) and (c)

165. One of the constituents in the preparation of Thiokol is
a) 1,2- dichloroethane b) Isoprene c) Chloroprene d) Sulphur

166. Bakelite is obtained from phenol by reacting with
a) $(CH_2OH)_2$ b) CH_3CHO c) CH_3COCH_3 d) HCHO

167. Polymerisation of chloroethylene gives the polymer:
a) Polythene b) PVC c) Teflon d) Nylon

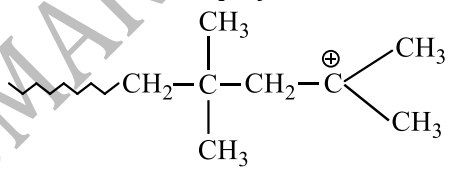
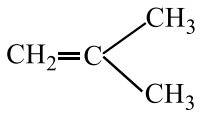
168. Condensation of caprolactam gives:
a) Nylon-6,6 b) Nylon-6 c) Nitrile rubber d) Nylon-6,10

169. Which of the following types of bonds are present in nylon-6, 6?
a) Covalent bond b) Double bond c) Hydrogen bond d) All of these

170. Which of the following is not a thermoplastic?
a) Polystyrene b) Teflon c) Polyvinyl chloride d) Novalac

171. Natural silk and artificial silk differ in one respect that one of them contains:
a) N b) S c) P d) None of these

172. A raw material used in making nylon-6,6 is:
a) Adipic acid b) Butadiene c) Ethylene d) Methylmethacrylate

173. The monomer of polymer
 is :
a) $CH_3CH=CH_2$ b)  c) $(CH_3)_2C=C(CH_3)_2$ d) $CH_3CH=CHCH_3$

174. Three dimensional molecules with cross links are formed in the case of a
a) Thermoplastic b) Thermosetting plastic c) Both (a) and (b) d) None of the above

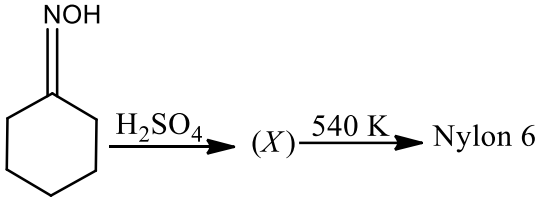
175. Polymerisation in which two or more chemically different monomers take part is called:
a) Addition polymerisation
b) Copolymerisation

c) Chain polymerisation
d) Homo polymerization

176. Which of the following type of forces are present in vulcanized rubber?
a) Weakest intermolecular forces
b) Hydrogen bonding
c) Three dimensional network of bonds
d) Metallic bonding

177. Teflon polymer is formed by the polymerization of
a) $CH_2 = CH - CN$
b) $F_2C = CF_2$
c) $Cl_2C = CH_2$
d) $H_2C = CHCl$

178. In the reaction sequence,



$(X)$is
a) Cyclohexanone
b) Caprolactum
c) $HO(CH_2)_6NH_2$
d) Hexamethylenediisocyanate

179. The polymer which is used in non-sticky kitchenware is
a) PVC
b) Teflon
c) Rayon
d) Isoprene

180. The chemical name of isoprene is
a) 2- methyl-1, 3-butadiene
b) 2-chloro-1, 3-butadiene
c) 2-methoxypropene
d) None of these

181. Which of the following is thermosetting polymer?
a) Nylon-6
b) Bakelite
c) Nylon-66
d) SBR

182. Glyptal or alkyd is polymer of:
a) Ethylene glycol and phthalic acid
b) Ethylene and phthalic acid
c) Phthalic acid and acetylene
d) None of the above

183. The correct statement about Thiokol rubber is that
a) It is a natural polysulphide rubber
b) It is resistant to oils and abrasion
c) It is prepared by addition polymerization
d) All of the above are correct

184. Which of the following is cross-linked polymer?
a) Teflon
b) Orlon
c) Nylon
d) Bakelite

185. Dacron is an example of
a) Elastomer
b) Fibre
c) Thermoplastic
d) Thermosetting polymer

186. A high molecular weight molecule, made up of a large number of smaller unis, is known as
a) Monomer
b) Biomolecule
c) Polymer
d) Both (b)and(c)

187. Polymers are:
a) Micromolecules
b) Macromolecules
c) Sub-micromolecules
d) None of these

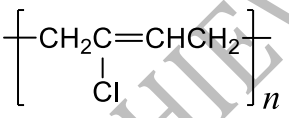
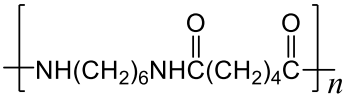
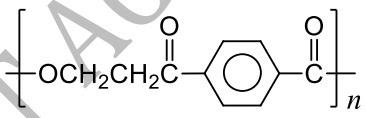
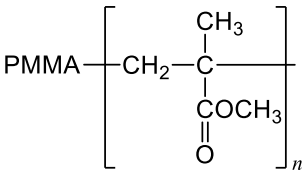
188. Which one is a homopolymer?
a) Bakelite
b) Nylon 6,6
c) Terylene
d) Neoprene

189. The plastic household crockery is prepared by using
a) Melamine and tetrafluoroethane
b) Malonic acid and hexamethyleneamine
c) Melamine and vinyl acetate
d) Melamine and formaldehyde

190. The polymer used in making synthetic hair wigs is made up of
a) $CH_2 = CHCI$
b) $CH_2 = CHCOOCH_3$
c) $C_6H_5CH = CH_2$
d) $CH_2 = CH - CH = CH_2$

191. Copolymer is:
a) Nylon-6
b) Nylon-6,6
c) Bakelite
d) Polythene

192. The polymer which has conducting power is
a) Polyethylene b) Polybutadiene c) Polystyrene d) Polyacetylene
193. Which one is protein fibre?
a) Cotton b) Rayon c) Silk d) Polyester
194. Strongest interparticle forces exists in:
a) Elastomers
b) Thermoplastics
c) Fibres
d) Thermosetting polymers
195. Buna-S is a synthetic copolymer of:
a) Styrene and 1, 3-butadiene
b) Styrene and ethylene
c) 1,3-butadiene and ethylene
d) None of the above
196. Which one ischain-growth polymers?
a) Teflon b) Nylon-6 c) Nylon-66 d) Bakelite
197. Which of the following polymer has ester linkage?
a) Nylon-66 b) PVC c) Terylene d) SBR
198. The polymer melmac is obtained by
a) Addition polymerization of melamine and formaldehyde
b) Free radical polymerisation of acrylonitrile
c) Condensation polymerization of melamine and formaldehyde
d) Coordination polymerisation of melamine
199. The monomer units of silicons a water repellant, acid resistant and heat resistant polymer is:
a) Si b) SiO_2 c) R_2SiO d) None of these
200. Which of the following belong to the class of natural polymers?
a) Proteins b) Cellulose c) Rubber d) All of these
201. Which process involves the formation of polystyrene from styrene?
a) Polymerisation
b) Racemization
c) Condensation
d) Reversible reaction
202. Which among the following is a synthetic polymer?
a) Proteins b) Polysaccharides
c) Natural rubber d) Phenol-formaldehyde resin
203. PVC is prepared by the polymerization of
a) Ethylene b) 1-chloropropene c) Propene d) 1-chloroethene
204. In the natural rubber, the isoprene units are joined in
a) Head to heat manner b) Tail to tail manner
c) Head to tail manner d) Random manner
205. Nylon is a
a) Polysaccharide b) Polyester c) Polyamide d) All of these
206. Which type of polymer is bakelite?
a) Addition polymer b) Homopolymer
c) Condensation polymer d) Biopolymer
207. Which of the following is not a polymer?
a) Teflon b) Petroleum c) Cellulose d) Natural rubber
208. Which is not an example of homopolymer out of the following?
a) PVC b) SBR c) Orlon d) Teflon
209. Which of the following is a biodegradable polymer?
a) Cellulose b) Polythene c) Polyvinyl chloride d) Nylon-6

210. The monomers used for the preparation of nylon 2-nylon 6 is/are
   a) Caprolactam
   b) Alanine and amino caproric acid
   c) Glycine and amino caproic acid
   d) Hexamethylenediamine and adipic acid
211. Nylon 6,6 is not a
   a) Condensation polymer
   b) Polyamide
   c) Homopolymer
   d) Copolymer
212. The polymer containing strong intermolecular forces e.g. hydrogen bonding, is
   a) Teflon
   b) Nylon-66
   c) Polystyrene
   d) Natural rubber
213. The strongest molecular forces are present in
   a) Elastomers
   b) Thermoplastics
   c) Fibres
   d) thermosetting polymers
214. The monomers of Buna-S rubber are
   a) Vinyl chloride and sulphur
   b) Butadiene
   c) Styrene and butadiene
   d) Isoprene and butadiene
215. Which of the following statements is not true?
   a) Natural silk is a protein
   b) PDI for natural polymers is greater than one
   c) Polyurethane foams are used for making pillows
   d) HDPE is prepared by Ziegler-Natta polymerisation
216. Bakelite is a product of the reaction between
   a) Formaldehyde and NaOH
   b) Aniline and urea
   c) Phenol and methanol
   d) Phenol and chloroform
217. Toluene di-isocyanate is used to prepare:
   a) Polyesters
   b) Polyamides
   c) Polycarbonates
   d) Polyurethanes
218. Which polymer is used in controlled drugs capsules?
   a) SBR
   b) PTFE
   c) PHBV
   d) PAN
219. Which one of the following is not correctly matched?
   a) Neoprene 
   b) Nylon-66 
   c) Terylene 
   d) PMMA 
220. Amongst the following the branched chain polymer is
   a) Polystyrene
   b) Low density polythene
   c) High density polythene
   d) Polyester
221. $CF_2 = CF_2$ is a monomer of
   a) Polystyrene
   b) Bakelite
   c) Glyptal
   d) Teflon
222. The monomer units of PTFE are:
   a) $Cl_2CH—CH_3$
   b) $F_2C=CF_2$
   c) $F_3C—CF_3$
   d) $FClC=CF_2$
223. Bakelite is an example of
   a) Elastomer
   b) Fibre
   c) Thermoplastic
   d) Thermosetting polymer
224. The monomer of PVC is

a) Ethane b) Chloroethene c) Dichloroethene d) Tetra chloroethene

225. The monomers of terylene are
a) Phenol and formaldehyde
b) Ethylene glycol and phthalic acid
c) Adipic acid and hexamethylene diamine
d) Ethylene glycol and terephthalic acid

226. A copolymer of vinyl chloride and vinyl acetate is called:
a) Vinylon b) Saran c) Dynel d) Orlon

227. Which one of the following statements is not true?
a) Natural rubber has the *trans*-configuration at every double bond
b) Buna-S is a copolymer of butadiene and styrene
c) Natural rubber is a 1,4-polymer of isoprene
d) In vulcanization, the formation of sulphur bridges between different chains make rubber harder and stronger

228. PMMA is the polymer of:
a) Methylmethacrylate b) Methylacrylate c) Methacrylate d) Ethylacrylate

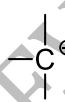
229. Polyethylene is
a) Random copolymer
b) Homopolymer
c) Alternate copolymer
d) Cross-linked copolymer

230. Which of the following is not a fibre?
a) Terylene b) Nylons c) Polyacrylonitrile d) Polychloroprene

231. Which of the following is not a biopolymer?
a) Proteins b) Rubber c) Cellulose d) RNA

232. Which of the following polymers does not involve cross-linkages?
a) Vulcanized rubber b) Melamine c) Bakelite d) Polystyrene

233. Natural rubber is not used in making footwear for polar regions because
a) Natural rubber becomes soft at temperature lower than10°C.
b) Natural rubber becomes brittle at temperature lower than10°C.
c) Natural rubber melts at temperature lower than 10°C.
d) Natural rubber becomes stronger at temperature lower than 10°C.

234. The intermediate never form during chain growth polymerization is
a)  b)  c)  d) 

235. The number average molecular mass and mass average molecular mass of a polymer are respectively 30,000 and 40,000. The poly dispersity index of the polymer is
a) <1 b) >1 c) 1 d) 0

236. Among the following, a natural polymer is
a) Cellulose b) PVC c) Polyethylene d) Teflon

237. Natural rubber is a polymer of
a) Styrene b) Isoprene c) Ethylene d) Butadiene

238. Nylon-6, 6 is obtained by condensation polymerization of
a) Adipic acid and hexamethylene diamine
b) Phenol and formaldehyde
c) Terephthalic acid and ethylene glycol
d) Sebacic acid and hexamethylene

239. Teflon, polystyrene and neoprene are all:
a) Copolymers
b) Condensation polymers
c) Homopolymers
d) Monomers

240. The best way to prepare polyisobutylene is
a) Coordination polymerization
b) Cationic polymerization
c) Anionic polymerization
d) Free radical polymerization

241. The compound that inhibits the growth of polymer chain during vinyl polymerization, is
a) Carbon tetrachloride b) p-benzoquinone c) Benzophenone d) Carbon dioxide

242. Synthetic rubber is
a) Polyisoprene b) Polychloroprene c) Polyethene d) Polyesters

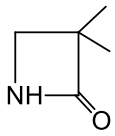
243. Which of the following is not a synthetic polymer?
a) Polyisoprene b) Polybutadiene
c) Polythlene terephthalate d) Polyethylene

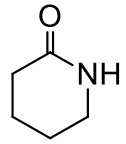
244. Nylon-6, 10 is a polymer of:
a) Hexamethylene and adipic acid
b) Hexamethylene and sebacic acid
c) Caprolactam
d) None of the above

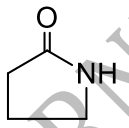
245. Buna –N is a polymer of
a) Butadiene and isoprene b) Butadiene and acrylonitrile
c) Isoprene and ethylene diamine d) Isoprene and butyl diamine

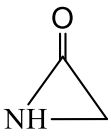
246. Which among the following is a chain-growth polymer?
a) Nylon b) Barkelite c) Terylene d) Teflon

247. Lactam from which nylon-4 is synthesised, is

a) 

b) 

c) 

d) 

248. Nylon threads are made up
a) Polyvinyl polymer b) Polyester polymer c) Polyamide polymer d) Polyethylene polymer

249. Thermosets are:
a) Cross-linked polymers
b) Don't melt or soften on heating
c) Cross-linking is usually developed at the time of moulding where they harden reversibly
d) All of the above

250. When two or more chemically different monomers take part in polymerization, it is called
a) Addition polymerization b) Copolymerization
c) Chain polymerization d) Homopolymerisation

251. In which of the following polymers, empirical formula resembles with monomer?
a) Bakelite b) Teflon c) Nylon-6,6 d) Dacron

252. A copolymer is obtained by polymerisation of:
a) One type of monomer units
b) More than one type of monomer units
c) Either of the above
d) None of the above

253. When condensation product of hexamethylenediamine and adipic acid is heated to 353 K(80°C) in an atmosphere of nitrogen for about 4-5h,the product obtained is
a) Solid polymer of nylon 66 b) Liquid polymer of nylon 66
c) Gaseous polymer of nylon 66 d) Liquid polymer of nylon66

254. Dacron is polymer is
a) Glycol and formaldehyde b) Glycol and phenol
c) Glycol and phthalic acid d) Glycol and terephthalic acid

255. Which of the following is not an example of addition polymer?
a) Terylene b) Polypropylene c) Polyethylene d) Polystyrene

256. Example of addition polymer is:
a) Buna-S b) Bakelite c) Nylon-6 d) Malamac

257. Natural fibre is:

a) Starch b) Cellulose c) Rubber d) Nylon-6

258. Select the correct statement.

a) Vinyon is a copolymer of vinyl chloride and vinyl acetate

b) Saran is a copolymer of vinyl chloride and vinylidine chloride

c) Butyl rubber is a copolymer of isobutylene and isoprene

d) All of the above are correct

POLYMERS

CHEMISTRY

: ANSWER KEY :

1)	c	2)	a	3)	c	4)	a	133)	d	134)	c	135)	d	136)	a
5)	d	6)	a	7)	b	8)	b	137)	c	138)	b	139)	b	140)	b
9)	d	10)	d	11)	a	12)	c	141)	a	142)	a	143)	a	144)	a
13)	d	14)	a	15)	d	16)	a	145)	d	146)	d	147)	c	148)	c
17)	c	18)	b	19)	b	20)	b	149)	d	150)	d	151)	c	152)	a
21)	d	22)	a	23)	d	24)	a	153)	c	154)	c	155)	d	156)	b
25)	a	26)	d	27)	d	28)	d	157)	d	158)	b	159)	b	160)	c
29)	c	30)	c	31)	c	32)	c	161)	a	162)	d	163)	b	164)	d
33)	b	34)	a	35)	c	36)	c	165)	a	166)	d	167)	b	168)	b
37)	b	38)	c	39)	b	40)	a	169)	d	170)	d	171)	a	172)	a
41)	d	42)	d	43)	a	44)	b	173)	b	174)	b	175)	b	176)	a
45)	c	46)	a	47)	a	48)	b	177)	b	178)	b	179)	b	180)	a
49)	b	50)	d	51)	b	52)	b	181)	b	182)	a	183)	b	184)	d
53)	d	54)	d	55)	a	56)	d	185)	b	186)	b	187)	b	188)	d
57)	c	58)	c	59)	d	60)	c	189)	d	190)	a	191)	b	192)	d
61)	b	62)	d	63)	b	64)	d	193)	c	194)	d	195)	a	196)	a
65)	c	66)	c	67)	a	68)	d	197)	c	198)	c	199)	c	200)	d
69)	c	70)	a	71)	a	72)	a	201)	a	202)	d	203)	d	204)	c
73)	b	74)	b	75)	a	76)	a	205)	c	206)	c	207)	b	208)	b
77)	d	78)	a	79)	b	80)	c	209)	a	210)	c	211)	c	212)	b
81)	c	82)	b	83)	a	84)	b	213)	d	214)	c	215)	b	216)	c
85)	c	86)	c	87)	d	88)	c	217)	d	218)	c	219)	c	220)	b
89)	b	90)	c	91)	a	92)	a	221)	d	222)	b	223)	d	224)	b
93)	d	94)	a	95)	a	96)	c	225)	d	226)	a	227)	a	228)	a
97)	d	98)	d	99)	c	100)	b	229)	b	230)	d	231)	b	232)	b
101)	c	102)	a	103)	c	104)	c	233)	b	234)	c	235)	b	236)	a
105)	a	106)	b	107)	b	108)	a	237)	b	238)	a	239)	c	240)	b
109)	b	110)	a	111)	c	112)	c	241)	b	242)	b	243)	a	244)	a
113)	b	114)	d	115)	a	116)	a	245)	b	246)	d	247)	c	248)	c
117)	a	118)	b	119)	c	120)	a	249)	d	250)	b	251)	b	252)	b
121)	d	122)	a	123)	d	124)	d	253)	d	254)	d	255)	a	256)	a
125)	c	126)	c	127)	c	128)	b	257)	b	258)	d				
129)	b	130)	c	131)	b	132)	c								

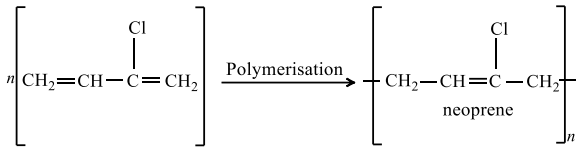
POLYMERS

CHEMISTRY

: HINTS AND SOLUTIONS :

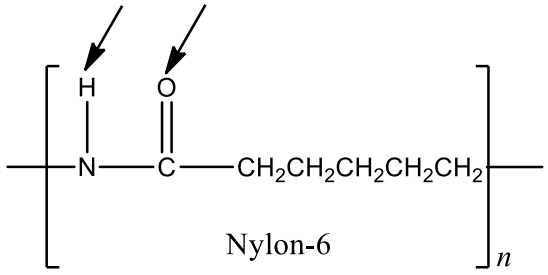
4 **(a)**

Neoprene is a polymer of chloroprene.

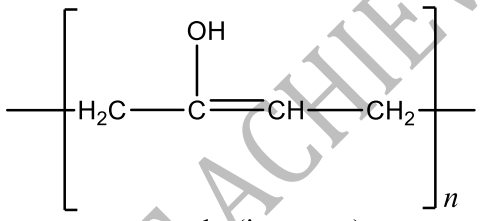


5 **(d)**

Nylon has amide linkage capable of forming intermolecular H-bonding as:



Due to H-bonding,nylon has strong intermolecular attraction. Cellulose is a polyhydroxy compound,also capable of forming strong intermolecular H-bonding. Polyvinyl chloride is a polar polymer due to carbon chlorine bond and it possessstrong dipole-dipole attraction. Natural rubber is poly-isoprene,a hydrocarbon,possess weak van der Waals' attraction.



cis-poly (isoprene)
natural rubber

6 **(a)**

This is definition of homopolymer.

9 **(d)**

Polymers are large molecules with high molecular weight, and a repeating unit. They do not carry any charge. They have high viscosity and can scatter light.

10 **(d)**

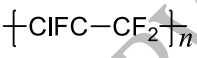
Chlorophyll is metallic complex of porphyrin ring with magnesium atom.

11 **(a)**

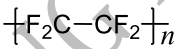
Vinyl derivatives containing electron releasing group readily undergo head to tail addition polymerization.

12 **(c)**

PCTFE and PTFE both have some carbon backbone.



PCTEE (polymonochloro tetrafluoroethylene)



PTEE (poly tetrafluoro ethylene)

13 **(d)**

With increase in molecular weight of a polymer, other properties such as tensile strength, crystallinity, melting point etc increase

15 **(d)**

Acetate rayon (cellulose acetate) is semisynthetic polymer obtained by using natural polymer cellulose by producing modifications by artificial means.

16 **(a)**

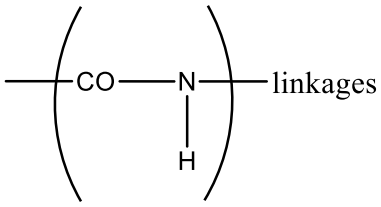
Ethene on free radical polymerisation gives low density polythene

17 **(c)**

Thermosets plastics are highly cross-linked materials with infusible mass, often called resins, *e*,g., vulcanised rubber, bakelite, etc.

18 **(b)**

Proteins are the condensation polymers of $\alpha -$ amino acids. Proteins contain peptide.



19 **(b)**

Natural rubber is a homopolymer of *cis*-isoprene, i.e., 2-methyl-1,3-butadiene.

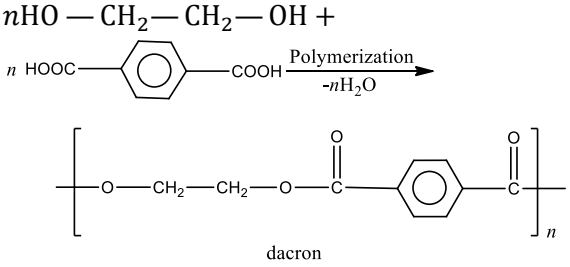
20 **(b)**

Poysaccharides have natural origin.

21 **(d)**
Follow text.

23 **(d)**
Rest all are addition polymers.

24 **(a)**
Dacron or teryleneis a condensation copolymer of ethylene glycol and terephthalic acid. It has —COO linkage.
Hence, it is a polyester.



25 **(a)**
Butyl rubber is a copolymer of isobutylene and isoprene.

26 **(d)**
Perlon or nylon-6 is obtained by the condensation of only one type monomer units (caprolactam), so it is a homopolymer.

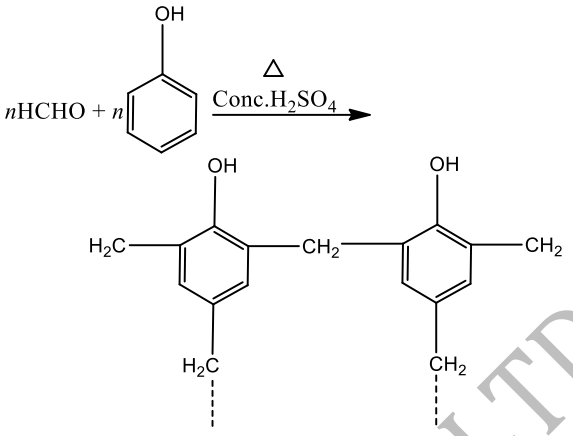
27 **(d)**
Dacron or terylene is synthetic polymer of ethylene glycol and terephthalic acid.

28 **(d)**
Nylon-6 is used in the manufacture of type cord. It is polymer of caprolactum. It contains amide linkage.

29 **(c)**
Vulcanisation is a process of treating natural rubber under heat and Sulphur to develop Sulphur to develop Sulphur cross-links and provide strength and resists wear and tear due to friction.

30 **(c)**
Styrene, because of the formation of more stable carbocation, readily undergoes chain growth polymerisation.

32 **(c)**
Bakelite is a thermosetting plastic formed by reaction of phenol with HCHOin the presence of conc.H_2SO_4.

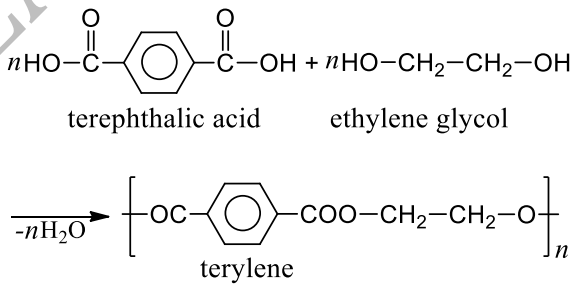


It is thus cross-linked polymer,condensation taking place at *o*- and *p*- positions.
Thus, HCHO.

33 **(b)**
Out of these statements, statement (b) is wrong.

34 **(a)**
Teflon is polymer of tetrafluoroethylene.

36 **(c)**
Addition polymers are obtained, when monomer contains multiple bond between carbon atoms.
Terylene is a condensation polymer of ethylene glycol and terephthalic acid.



37 **(b)**
Teflon is a polymer of $CF_2{=}CF_2$.

39 **(b)**
Neoprene is addition polymer of chloroprene.

41 **(d)**
DNA is a natural biopolymer.

42 **(d)**
Nylon-6 6 is polymer of
COOH —$(CH_2)_4$ —COOH
Adipic acid and H_2N —$(CH_2)_6$ —NH_2
(hexamethylenediamine)
∴Nylon-66 has nitrogen in it.

43 **(a)**
Cellulose acetate has been used in the manufacture of non inflammable pohotographic films.

44 **(b)**
Electron releasing groups such as CH_3, $-OCH_3$

activate the monomer towards cationic polymerisation as these groups provide stability to the carbocation formed. Thus, the correct order is

$$CH_2 = CHC_6H_5(OCH_3) > CH_2 = CH - C_6H_5(CH_3) > NO_2C_6H_5 - CH = CH_2$$

45 **(c)**
In cationic polymerization,carbocationsare formed. Greater the stability of the carbocation, more reactive is the alkene. Since, the stability of the intermediate carbocation follows the order.

$$CH_3-\overset{+}{C}HC_6H_5 > CH_3-\overset{+}{C}HCH_3 > CH_3-\overset{+}{C}H-Cl > CH_3-\overset{+}{C}HCO_2CH_3$$

Therefore, reactivity decreases in the same order. Thus, styrene is most reactive.

46 **(a)**

$$nCH_2{=}CHCl \xrightarrow{\text{Addition polymerisation}} \left[CH_2-\underset{Cl}{CH}\right]_n$$

This is PVC, a homopolymer.

47 **(a)**
There are six carbon atoms is hexamethylenediamine and ten carbon atoms in sebacic acid, so the name of the nylon is nylon-6, 10. (Remember first the number of carbon atoms of amines are written).

48 **(b)**
SBR (styrene-butadiene) is a synthetic rubber.

49 **(b)**
Natural rubber obtained from plant named as *Heveabrasiliensis*. It is addition homopolymer of isoprene.

$$-(CH_2 - \underset{CH_3}{C} = CH_2 - CH) -$$

Natural rubber

50 **(d)**
The monomer used for the preparation of PVC (Poly vinyl chloride) polymer is vinyl chloride.*i.e.,* $CH_2 = CH - Cl$.

$$nCH_2{=}CHCl \xrightarrow{\text{Peroxide}} \left[CH_2-\underset{Cl}{CH}\right]_n$$

vinyl chloride — PVC

51 **(b)**
Lexan is a polymer of diethyl carbonate and bisphenol-A.

52 **(b)**
When a diacid is condensed with dialcohol, the polymer obtained contains ester linkage.

$$n\text{HOCH}_2\text{CH}_2\text{OH} + n\text{HOOC}-C_6H_4-\text{COOH} \xrightarrow{-H_2O}$$

ethylene glycol (dialcohol) + terephthalic acid (diacid)

$$\left[-O-CH_2CH_2-\underset{\text{ester linkage}}{OOC}-C_6H_4-CO-\right]_n$$

dacron

53 **(d)**
Rayon, an artificial silk, contains long fibres of purificed cellulose

54 **(d)**
These are characteristics of thermoplastics.

55 **(a)**
PCTFE is polymer of chlorotrifluoro ethane.

56 **(d)**
Nylon is not homopolymer as it is a copolymer. The monomers of nylon-66 are adipic acid and hexamethylenediamine. Nylon contain

$-\overset{O}{\overset{\|}{C}}-NH-$ (amide) linkage,hence they are structurally polyamide. Also nylon is condensation polymer as molecule

$$n\text{HOOC}-(CH_2)_4-\text{COOH} + n\,.\,\text{HNH}-(CH_2)_6-NH_2 \xrightarrow{-nH_2O}$$

$$\left[-\overset{O}{\overset{\|}{C}}-(CH_2)_4-\overset{O}{\overset{\|}{C}}-\underset{H}{N}-(CH_2)_6-NH-\right]$$

nylon-66

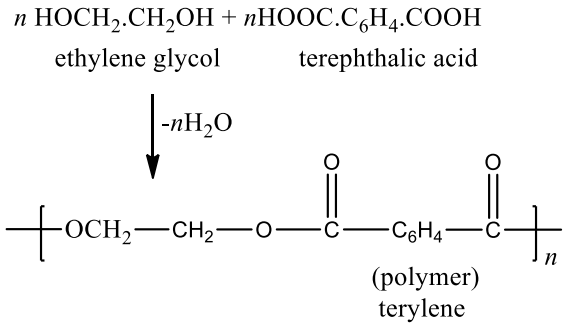
57 **(c)**
Thiokol is a synthetic rubber.

58 **(c)**
Ethylene glycol on reaction with terephthalic acid forms the polymer terylene(also known as Dacron or terene) which is used as synthetic fibre.

$$n\,\text{HOCH}_2\,.\,\text{CH}_2\text{OH} + n\,\text{HOOC}\,.\,C_6H_4\,.\,\text{COOH}$$

Ethylene glycol + terephthalic acid

$\downarrow -n\,H_2O$



59 **(d)**
All are the characteristics and example of terpolymer.

60 **(c)**
Protein is a natural polymer of amino acids.

61 **(b)**
It is definition of copolymerisation.

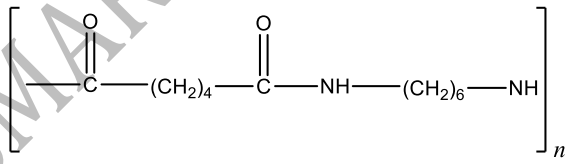
63 **(b)**
The vulcanisation of rubber makes it elastic and strengthened.

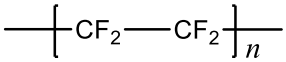
64 **(d)**
Nylon is a copolymer of hexamethylenediamine and adipic acid.

65 **(c)**
Buna-S is a elastomer, thus has weakest intermolecular forces. Nylon 66, is a fibre, thus has strong intermolecular forces like H-bonding. Polythene is a thermoplastic polymers,thus the intermolecular force present in polythene are in between elastomer and fibres. Thus, the order of intermolecular force of these polymers is
$\text{Buna} - \text{S} < Polythene < Nylon\ 66$
$(B)(C)(A)$

66 **(c)**
Rayon is regenerated fibre.

68 **(d)**
Nylon-66 is polyamide fibre which is manufactured by the condensation polymerization of adipic acid and hexamethylenediamine.



69 **(c)**
Teflon  is fully fluorinated polymer.

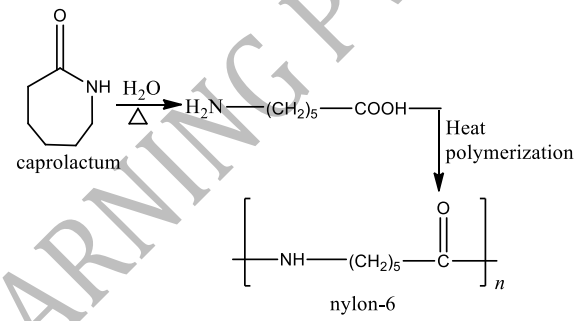
73 **(b)**
The ratio of weight average molecular weight and the number average molecular weight is called poly dispersity index.
(PDI).

$$PDI = \frac{\bar{M}_w}{\bar{M}_n}$$

Where,
$\bar{M}_w$ =weight average molecular weight
$\bar{M}_n$ = number average molecular weight
PDI is unity for natural monodispersed polymer but for synthetic polymers it is always greater than unity.

75 **(a)**
Buna rubber is homopolymer of 1, 3-butadiene.

76 **(a)**
Caprolactum condenses to form nylon-6.



77 **(d)**
The plastics which do not soften very much on heating can be made soft and readily workable by the addition of certain organic substances called plasticisers, e.g., dialkyl phthalate.

78 **(a)**
A fact; H-bonding makes them highly crystalline and highly tensile material.

79 **(b)**
In natural rubber, methyl groups are arranged randomly. Thus, catalytic hydrogenation also results in a random molecule, ie, in an atactic product.

80 **(c)**
Nylon-66 is a polyamide fibre.

81 **(c)**
The commercial natural rubber is obtained from the tree *Heveabrasiliensis*. Natural rubber is found to be a polymer of *cis*-isoprene.

$$CH_2 = \underset{\displaystyle CH_3}{\underset{|}{C}}H = CH_2$$

Hence, it is a polymer of *cis*-isoprene.

82 **(b)**
Bakelite is a copolymer of HCHO and phenol.

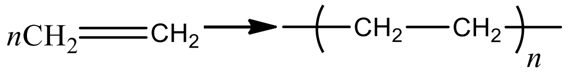
83 **(a)**
The characteristic of rayon.

84 **(b)**
Terylene or dacron is a polyester of ethylene glycol and dimethyl terephthalate.

86 **(c)**
Cellulose diacetate(used in making threads) is a semi-synthetic polymer as it s obtained from natural polymer ($i.e.$, cellulose) by chemical modification.

87 **(d)**
Rest all are natural polymers.

88 **(c)**



polyethylene is obtained by the polymerization of ethylene.

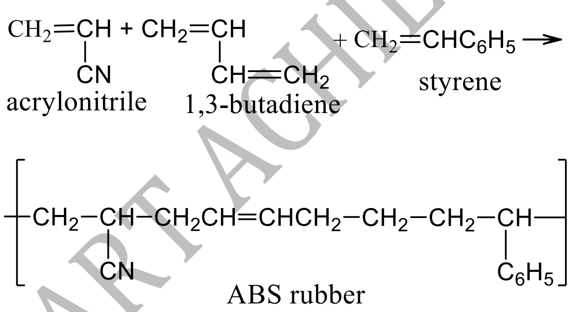
89 **(b)**
Due to presence of chains of varying length in a polymer sample, their molecular mass is always expressed as an average.

90 **(c)**
PDI abbreviates as polydisperity index of polymer.

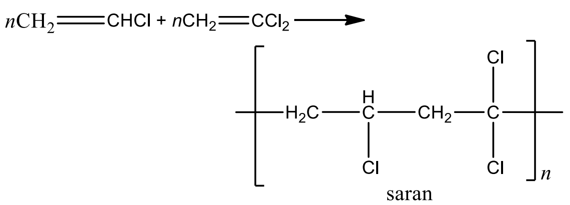
$$\text{PDI} = \frac{\bar{M}_w}{\bar{M}_n}$$

For natural polymers PDI=1, $i.e.$, $\bar{M}_w = \bar{M}_n$
For synthetic polymers PDI >1, $i.e.$, $\bar{M}_w > \bar{M}_n$

91 **(a)**
ABS is acrylonitrile-butadiene-styrene rubber which is obtained by copolymerisation of acrylonitrile, 1, 3-butadiene and styrene.



92 **(a)**
Saran is a copolymer of vinyl chloride and vinylidine chloride.



93 **(d)**
Ethene, propene and styrene are olefins.

94 **(a)**
In polystyrene, head to tail chain growth polymerization occurs

95 **(a)**
Bakelite is step growth polymer, $i.e.$, the condensation involving the reaction of functional group, e.g., terylene, bakelite, etc.

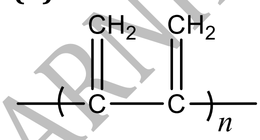
96 **(c)**
Chloroprene is $CH_2 = CH - \underset{\underset{Cl}{|}}{C}H = CH_2$.

It is obtained by treating vinylacetylene with HCl.

$$CH_2 = CH - C \equiv CH + HCl \longrightarrow CH_2 = CH - \underset{\underset{Cl}{|}}{C} = CH_2$$

2-chloro-1,3-butadiene
(chloroprene)

97 **(d)**



It suggests polymerization on the lost of vinylic hydrogen atom, which is not possible.

98 **(d)**
Electron withdrawing groups make the monomer more reactive towards anionic polymerization

99 **(c)**
Thiokol is polymer of CH_2ClCH_2Cl and sodium polysulphide Na—S—S—Na and thus, not polydiene rubber.

101 **(c)**
The process of condensation polymerization takes place in the following manner.

$$A + B \xrightarrow{\text{Condense}} A - B$$

Monomers dimer

$$A - B + A \xrightarrow{\text{Condense}} A—B—A$$

$$A—B—A + B \longrightarrow A—B—A—B$$

In this process no initiator is required and it is also called step growth polymerization.

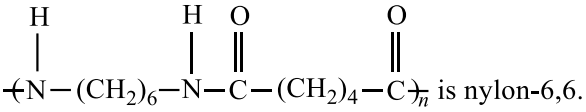
103 **(c)**
Glycerol trinitrate is explosive.

104 **(c)**
Polyhydroxy butyrate — CO— β—hydroxyl valerate(PHBV) is a biodegradable polymer.

106 **(b)**
Saran is a copolymer of vinyl chloride and vinyledene chloride.

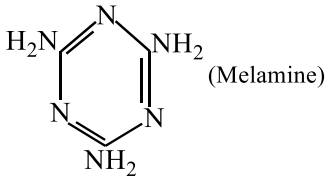
107 **(b)**

Nylon-6, 6, is polyamide having —CONH gp.



108 **(a)**

Melamine plastic crockery is a copolymer of HCHO and



110 **(a)**

Teflon is used for this purpose.

111 **(c)**

Buna-S (SBR) is synthetic rubber.

112 **(c)**

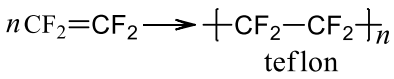
(i)Terylene is a polyester as it has ester linkages.

(ii)Nylon is a polyamide as it has amide linkages.

(iii) Orlon and rayon are synthetic fibres.

113 **(b)**

Teflon is prepared by the combination of a large number of tetrafluoroethylene molecules, without the elimination of any small molecule. Therefore, it is an example of addition homopolymer



114 **(d)**

Bakelite is thermoset plastic.

115 **(a)**

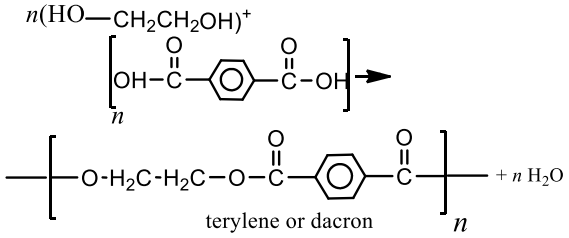
(i) Addition polymerization the molecules of monomer join together without loss of any molecule to form polymer during this process.

(ii) Esterification in this reaction acid and alcohol react together to form ester.

(iii) Saponification during this reaction, soap is formed by reaction of glycerol with alkali.

(iv) Condensation polymerization monomers polymerise to form polymer along with loss of small molecules during condensation polymerization.

Terylene or dacron is condensation polymer. It is formed by condensation of terephthalic acid with ethylene glycol along with loss of water molecule.



116 **(a)**

CH_3

|

(a) $H_2C = C - CH = CH_2$is isoprene of 2-methyl 1, 3-butadiene. It is a monomer of natural rubber.

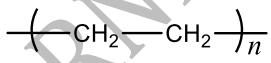
CH_3

|

(b) $H_2C = C - CH = CH_2$ is chloroprene or 2-chloro 1, 3-butadiene. It is a monomer of neoprene.

(c) $C_6H_5CH = CH_2$is styrene. It is copolymer of buna-S rubber.

(d)



117 **(a)**

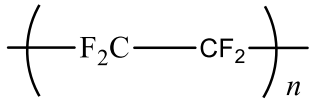
Among the given, only vulcanized rubber has elastic character, so it is an elastomer

118 **(b)**

Copolymers are obtained by the reaction of two or more different monomers. PVC (polyvinyl chloride) is a polymer of only one monomer unit, which is vinyl chloride.

120 **(a)**

Teflon is a polymer of tetrafluorothylene. It is used for coating articles and cookware to make them non sticky.



Nylon66 is a polymer of adipic acid and hexamethylenediamine. Glyptal is a polymer of ethylene glycol and phthalic acid. Buna –S is a polymer of butadiene and styrene.

121 **(d)**

All these are characteristics of elastomers.

122 **(a)**

Cellulose is a biodegradable polymer.

123 **(d)**

Generally high boiling esters or haloalkanes act as plasticizer.

125 **(c)**
Rest all produces pollutant gases (CO_2, SO_2, CO, etc.).

126 **(c)**
Polystyrene and orlon, being vinyl derivative, are chain growth polymers while Dacron is a step growth polymer

127 **(c)**

$$2HC \equiv CH \xrightarrow[NH_4Cl]{Cu_2Cl_2} H_2C = CH - C = CH$$

vinyl acetylene

$$\xrightarrow{HCl} CH_2 = CH - \underset{\displaystyle Cl}{\underset{|}{C}} = CH_2$$

Chloroprene

$$\xrightarrow{\text{polymerization}} \left(CH_2 - \underset{\displaystyle Cl}{\underset{|}{C}} = \underset{\displaystyle H}{\underset{|}{C}} - CH_2\right)_n$$

128 **(b)**
Butyl rubber is a copolymer of isobutylene and isoprene.

131 **(b)**
Ziegler's catalyst used in polymerisation of ethane is $(C_2H_5)_3Al + TiCl_4$

132 **(c)**
Terylene or dacron is a polyester of ethylene glycol and dimethyl terephthalate.

133 **(d)**
PCTFE (poly monochloro tetrafluoro ethylene), $\left(ClFC - CF_2\right)_n$ is not a polyacrylate.

134 **(c)**
Orlon is polymer of acrylonitrile ($CH_2 = CH - CN$)

135 **(d)**
High density polythene is obtained, when ethane undergoes Ziegler-Natta polymerisation. In this process, Ziegler-Natta catalyst, a mixture of titanium tetrachloride ($TiCl_4$) and trimethyl aluminium [$(CH_3)_3Al$] is used to catalyse the polmerisation.

137 **(c)**
Neoprene (synthetic rubber) resembles with natural rubber.

$$\left(CH_2 - CH = C(Cl) - CH_2\right)_n$$

neoprene

$$\left(CH_2 - CH = C(CH_3) - CH_2\right)_n$$

natural rubber

138 **(b)**
It is definition of polymerisation.

139 **(b)**
Addition of sulphur to rubber, makes it hard.

140 **(b)**
Terylene or Dacron is a polymer, formed by ethylene glycol and dimethyl terephthalate.

142 **(a)**
Dacron or terylene is a condensations polymer (a polyester) of ethylene glycol and terephthalic acid. Generally dimethyl terephthalate is used inspite of terephthalic acid.

$$nHO - CH_2 - CH_2 - OH + n\,H_3COOCC_6H_4COOCH_3 \rightarrow \left(OCH_2CH_2O - COC_6H_4CO\right)_n + nCH_3OH$$

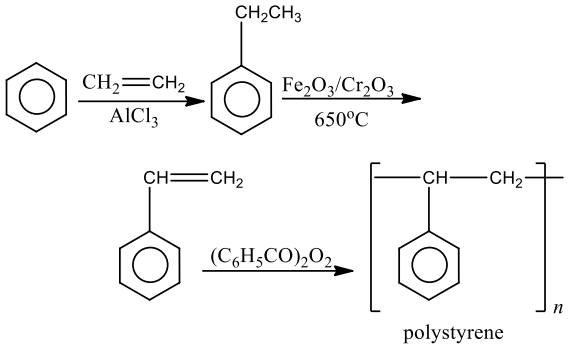
dacron

144 **(a)**
Rubber is natural polymer. Nylon-6,nylon-6 6 and nylon 6,10 are synthetic fibre or man-made polymers.

145 **(d)**
Nylon-6, 6 is fibre.

146 **(d)**
Bakelite was the first synthetic polymer.

147 **(c)**
Chain growth polymerization requires an initiator (such as organic peroxides) to produce a free radical to which the monomers are added in a chain fashion. Initiators are added in a very small quantities and are decomposed by heat, light or oxidation-reduction reaction to produce reactive species.*e,g.*, free radical.
Polystyrene is an example of chain growth polymer because in it styrene molecules are associated in the form of monomer.



148 **(c)**

$$\text{PDI} = \frac{\bar{M}_w}{\bar{M}_n}$$

For synthetic polymer, PDI>1

$\therefore\ \bar{M}_w > \bar{M}_n$

150 **(d)**

All are characteristics of gutta parcha rubber.

151 **(c)**

Orlon is a polymer of vinyl cyanide or acrylonitrile (CH_2 =CHCN)

152 **(a)**

Vulcanized rubber has sulphur.

$\therefore SF_6$ is used in vulcanization of rubber.

153 **(c)**

ATP is a monomer molecule.

154 **(c)**

Buna-N actually abbreviated from where **Bu** represents 1,3-butadiene,**Na** represents **Na**, sodium and **N** represents nitrile (acrylonitrile).Thus buna-N is copolymer of 1,3-butadiene and acrylonitrile usually polymeries in the presence of sodium.

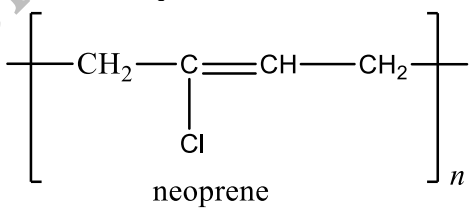
156 **(b)**

Neoprene is a synthetic rubber. It is prepared by polymerization of chlorine (2-chlorobuta-1, 3-diene).

$$n\text{CH}_2 = \text{C} - \text{CH} = \text{CH}_2 \xrightarrow{\text{Polymerisation}}$$

Cl

Chloroprene



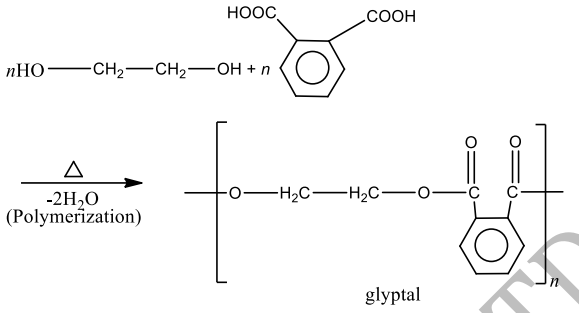
neoprene

157 **(d)**

Rest all are thermosets.

159 **(b)**

Glyptal or alkyl resin is a polymer of ethylene glycol and phthalic acid.



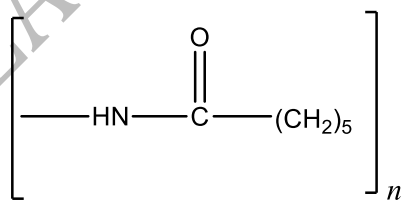
160 **(c)**

Nylon is a polymer of diacid with diamine. Adipic acid is $HOOC(CH_2)_4COOH$

161 **(a)**

(i) Addition polymers are those in which monomer units combine without loss of small molecules. Rubber,polyvinyl chloride and polyethylene are addition polymers.

(ii) Condensation polymers are those in which monomer units condense to form large units along with loss of small molecules like H_2O, NH_3.-

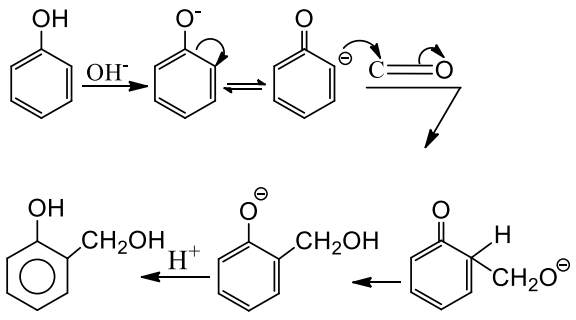


is amide linkage, formed by

condensation of – COOH group with $-NH_2$ group. It is accompanied by loss of water. So, it is condensation polymer.

162 **(d)**

It is aromatic electrophilic substitution.

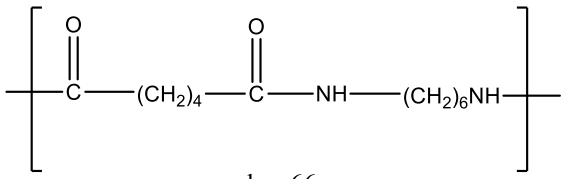


163 **(b)**

Nylon-66 is polymer of adipic acid and hexamethylenediamine.

$n\text{HOOC} - (\text{CH}_2)_4 - \text{COOH} + \text{H}_2\text{N} - (\text{CH}_2)_6\text{NH}_2$

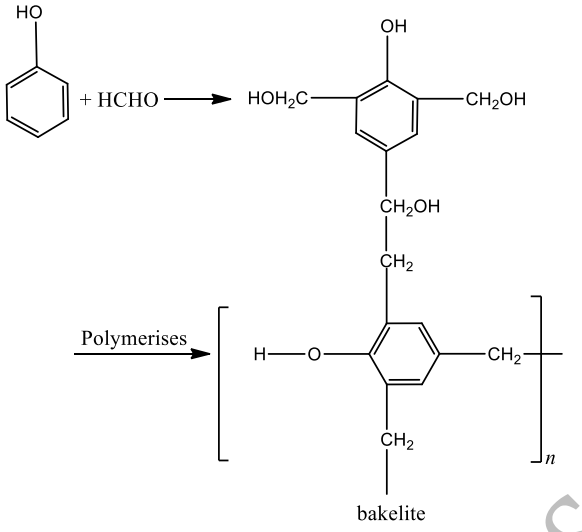
Adipic acid hexamethylenediamine



nylon-66

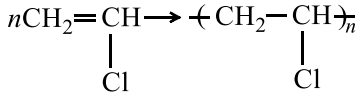
165 **(a)**
Thiokol or polysulphide rubber is a polymer of 1, 2-dichloroethane (or ethylenedichloride) and sodium tetrasulphide.

166 **(d)**
Bakelite is obtained from phenol by reacting with HCHO in the acidic or alkaline medium.



bakelite

167 **(b)**



This is polyvinyl chloride or PVC.

168 **(b)**
Nylon-6 is a condensation polymer of caprolactam.

170 **(d)**
Novalac is not a thermoplastic.

171 **(a)**
Natural silk contains nitrogen while artificial silk is not.

172 **(a)**
Nylon-6,6 is a condensation copolymer of adipic acid[$COOH(CH_2)_4COOH$] and hexamethylene diamine.

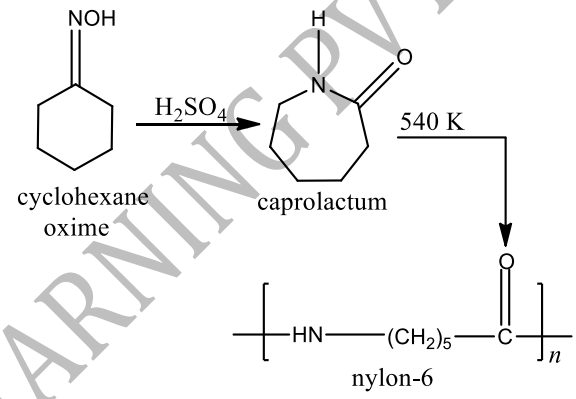
174 **(b)**
Thermosetting plastics are polymers prepared from semifluid polymers with low molecular masses by heating in a mould. They have excessive cross linking between the chains forming three dimensional networks of bonds.

175 **(b)**
It is definition of copolymerisation.

176 **(a)**
Vulcanized rubber is highly elastic, so intermolecular forces present in it, are weakest.

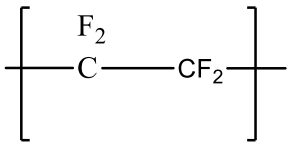
177 **(b)**
(i) $CH_2 = CH - CN$(acrylo nitrile) polymerises to form PAN.
(ii) $CH_2 = CHCl$(vinyl chloride) polymerises to form PVC.
(iii) $F_2C = CF_2$(tetrafluoroethylene) polymerises to form Teflon.

178 **(b)**
Caprolactum is the monomer of nylon-6.



cyclohexane oxime — caprolactum — nylon-6

179 **(b)**
Teflon (polytetrafluoroethylene is a polymer of tetrafluoroethylene and is used for non-stick utensils coating.



180 **(a)**
Isoprene is $CH_2 = C(CH_3) - CH = CH_2(2 - \text{methyl} - 1,3 - \text{butadiene})$.

181 **(b)**
Thermosetting polymer A thermosetting polymer is one which becomes hard on heating. It cannot be softened by heating *e.g.,* Bakelite which is formed by reaction between phenol and formaldehyde.
$N\text{Phenol} + n\text{HCHO} \longrightarrow$ bakelite.

182 **(a)**
It is a copolymer of ethylene glycol and phthalic acid.

183 **(b)**
Thiokol is a synthetic polysulphide rubber which is obtained by the condensation polymerisation of ethylene dichloride and sodium polysulphide. It is

resistant to oils and abrasion

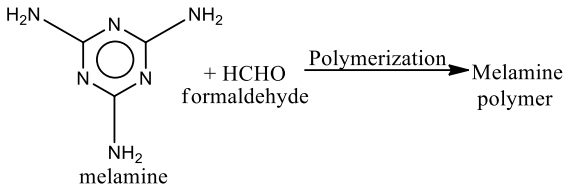
184 **(d)**
(i) Teflon, orlonand nylon are straight chain polymers.

(ii) Bakelite is cross-linked condensation copolymer of phenol and formaldehyde.

187 **(b)**
Polymers are substances of high molecular weight (usually more than a few thousand) formed by the union of small molecular weight substances by covalent bonds.

188 **(d)**
Neoprene is a homopolymer of 2-chloro-buta-1,3-diene or chloroprene.

189 **(d)**
The unbreakable plastic household crockery is made from opolymer of formaldehyde (HCHO) and melamine.



190 **(a)**
SARAN, a polymer of vinyl chloride ($CH_2 = CHCl$) and vinylidene chloride, is used for making synthetic hair wigs.

191 **(b)**
Terylene or dacron is a polyester of ethylene glycol and dimethyl terephthalate.

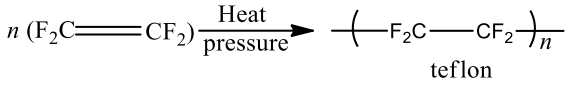
192 **(d)**
Polyacetylene, due to presence of double bonds, is a conducting polymer.

193 **(c)**
Silk wool are protein fibre. Cotton rayon is cellulose fibre, terylene is polyester fibre.

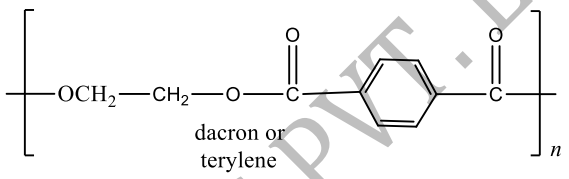
194 **(d)**
In thermosets, cross linking is usually developed at the time of moulding where they harden irreversibly.

195 **(a)**
Buna-S is a copolymer of 1,3-butadiene and styrene.

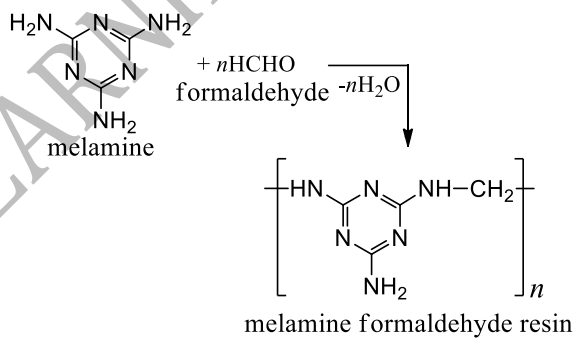
196 **(a)**
Chain growth polymers are formed by the chain growth polymerization or chain polymerization. This polymerization process involves a series of reaction each of which consumes a reactive particle and produces another similar particle resulting a chain reaction. Teflon is a chain growth polymer.
It is the polymer of tetrafluoroethylene.



197 **(c)**
Terylene has ester linkage. It is a polymer of ethylene glycol with terephthalic acid. It is used in texile industry.



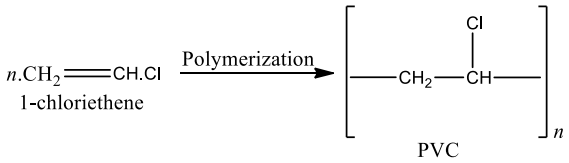
198 **(c)**
Melmac is a condensation polymer of melamine and formaldehyde.



199 **(c)**
R_2SiO is monomer unit of silicons.

200 **(d)**
All these are natural polymers and exist in nature.

203 **(d)**
PVC is polyvinyl chloride, a polymer of vinyl chloride.



205 **(c)**
In nylon amide linkages are present.

206 **(c)**
Bakelite is a polymer of formaldehyde (HCHO) and phenol (C_6H_5OH)and formed with the loss of water molecules, it is a synthetic condensation copolymer.

207 **(b)**
Teflon, cellulose and natural rubber are examples of polymer, but petroleum is dark yellow-

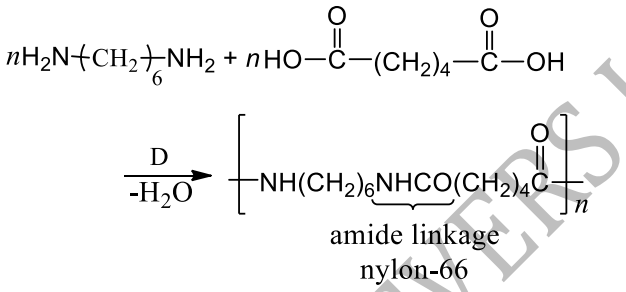
brown,lighter than water,oily liquid found in impervious rocks in the earth. It is the main source of Lycho carbon and fuel.

208 **(b)**
SBR (styrene-butadiene rubber) is a polymer of two different monomers, so it is a copolymer.

209 **(a)**
Cellulose is a biodegradable polymer

210 **(c)**
Nylon2-nylon 6 is an alternating polyamide copolymer of glycine and amino caproicacid. It is a bio-degradable polymer.
$H_2N - CH_2 - COOH$ — glycine
$H_2N(CH_2)_5COOH$ —amino caproic acid

211 **(c)**
Nulon-6, 6 is obtained by the condensation of hexamethylene diamine with adipic acid. Since, two different monomers involve in its preparation, it is a copolymer.



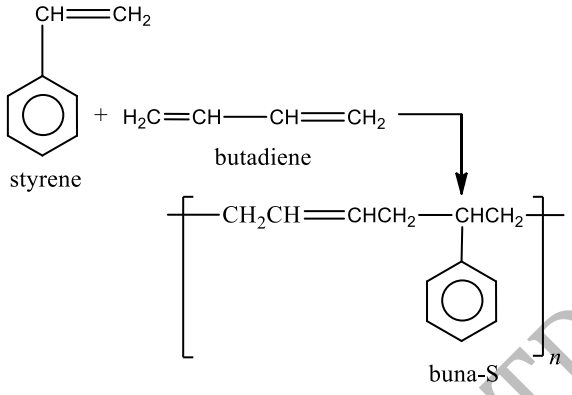
212 **(b)**
In nylon-66 hydrogen bonds are formed between

$$-\overset{O}{\overset{\|}{C}}-NH-$$

group of successive chains.

213 **(d)**
Due to presence of extensive cross-linking, thermosetting polymers have strongest molecular forces.

214 **(c)**
Buna-S rubber is also called SBR *i.e.,* styrene butadiene rubber. It is a copolymer of 75% butadiene ($CH_2=CH-CH=CH_2$) and 25% styrene($C_6H_5-CH=CH_2$).

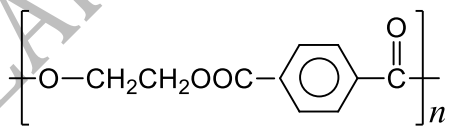


215 **(b)**
PDI and for natural polymers is one

217 **(d)**
Polyurethane is a copolymer of ethylene glycol and toluene di-isocyanate or ethylene di-isocyanate.

218 **(c)**
PHBV (Poly $-\beta-$hyroxy butyrate-CO-β hydroxyl valerate) is used in controlled drug release.

219 **(c)**
Terylene is



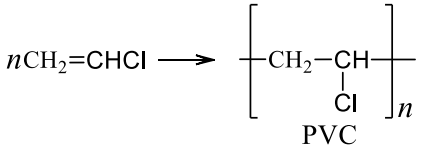
220 **(b)**
Low density polythene is a branched chain polymer.

222 **(b)**
PTFE is Teflon; teflon is a polymer of $F_2C=CF_2$.

223 **(d)**
Bakelite, due to presence of extensive crosslinking, is an example of thermosetting polymer

224 **(b)**
PVC (poly vinyl chloride) is a polymer of vinyl chloride or chloroethene

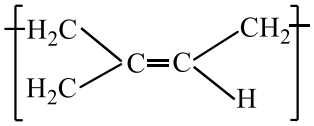
($CH_2=CHCl$).



225 **(d)**
Terylene is a polymer of ethylene glycol and terephthalic acid.

226 **(a)**
Vinylon is copolymer of vinyl chloride and vinyl acetate.

227 **(a)**
Natural rubber is *cis*-configuration of 1,4-polyisoprene or



Natural rubber

228 **(a)**
PMMA is a polymer of methylmethacrylate, *i. e.*, Perspex.

229 **(b)**
Random copolymer the polymer is made of two types of monomer units. The monomer units are arranged randomly. If *A* and *B* are two different monomers, then random copolymer will have following structure.
— *A*— *B*— *A*— *B*— *B*— *B*— *A*— *A*— *A*— *B*—
Alternative copolymer the polymer is made of two types of monomer units arranged alternately *eg.*
— *A*— *B*— *A*— *B*— *A*— *B*— *A*— *B*
Cross-linked polymer in these types of polymers a short side chain of atoms links two longer linear chains of polymes.
Homopolymer it is polymer made of molecules of same substance e.g., polyethylene.

230 **(d)**
It is neoprene rubber.

231 **(b)**
Since proteins, cellulose and RNA control various activities of plants and animals, they are called biopolymers.

232 **(b)**
Polystyrene contains only linear chains.

233 **(b)**
Natural rubber is a linear polymer of isoprene (2-methyl-1, 3-butadiene). It becomes soft at high temperature (335 K) and brittle at low temperature (< 283),so it is not used in making footwear for polar regions.

234 **(c)**
Carbenes are never produced during chain growth polymerisation.

235 **(b)**

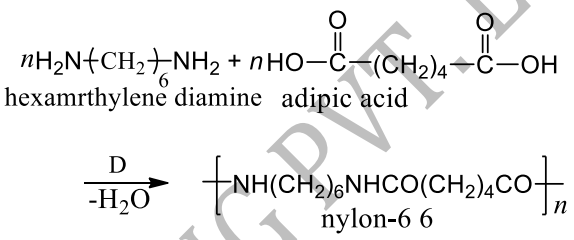
$$PDI = \frac{\bar{M}_w}{\bar{M}_n} = \frac{40{,}000}{30{,}000}$$

So, the value is more than 1.

236 **(a)**
Cellulose is a natural polymer.

237 **(b)**
Natural rubber is a polymer of Isoprene.

238 **(a)**
Nylon-6 6 is obtained by condensation copolymerisation of adipic acid and hexamethylene diamine.

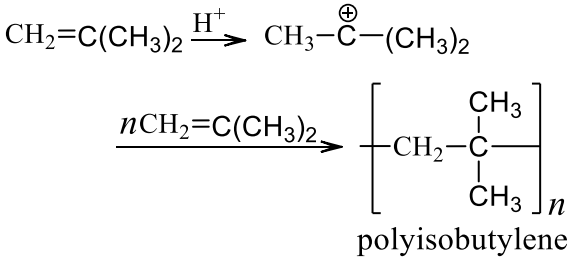


hexamrthylene diamine adipic acid

nylon-6 6

239 **(c)**
Teflon (a polymer of $CF_2=CF_2$), polystyrene (a polymer of $C_6H_5CH=CH_2$) and neoprene (a polymer of $CH_2=CCl\cdot CH=CH_2$) are homopolymers.

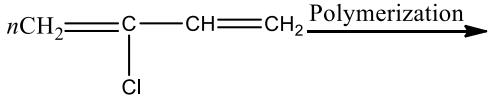
240 **(b)**
Since 3° carbocations are most stable, the best way to obtain polyisobutylene is acid catalysed or cationic polymerisation is presence of lewis acid or protonic acid



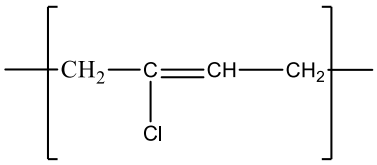
polyisobutylene

241 **(b)**
Certain amines, phenols and quinones are used to inhibit the growth of polymer chain.

242 **(b)**
Synthetic rubber or neoprene is a polymer of chloroprene (2-chlorobuta-1, 3-diene). Hence, it is called polychloroprene.



chloroprene



neoprene or polychloroprene

243 **(a)**

Polyisoprene is natural rubber.

244 **(a)**

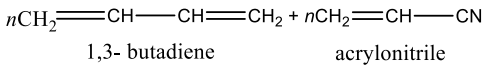
Nylon-6,10 (read as six, ten) is a copolymer of hexamethylene (six atoms) and sebacic acid (a dibasic acid of 10 carbon atoms).

245 **(b)**

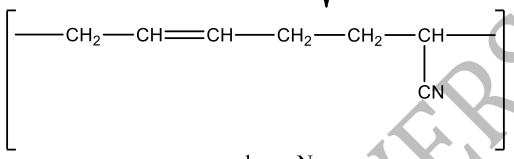
Buna –N is synthetic rubber which is polymer of butadiene with acrylonitrite.

$n\mathrm{CH_2} = \mathrm{CH} - \mathrm{CH} = \mathrm{CH_2} + n\mathrm{CH_2} = \mathrm{CH} - \mathrm{CN}$

1, 3- butadiene acrylonitrile



1,3- butadiene acrylonitrile



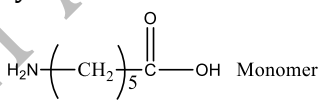
buna-N

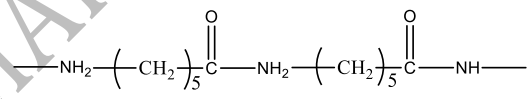
247 **(c)**

For the synthesis of nylon-4, lactam with four carbon atoms is required.

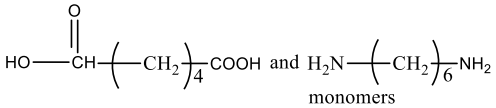
248 **(c)**

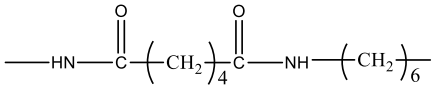
Nylon threads are made up of Polyamide. Some common are Nylon-6

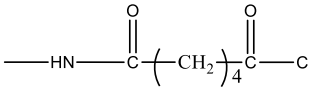




Nylon-66







249 **(d)**

These are characteristics of thermosets.

251 **(b)**

In addition homopolymers such as Teflon, empirical formula resembles with monomer.

252 **(b)**

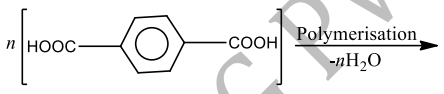
This is definition of copolymer.

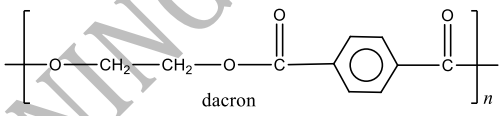
253 **(d)**

The condensation polymerization of hexanethylenediamine and adipic acid is done in solution form by interface technique. In this liquid nylon polymer is obtained.

254 **(d)**

$n(\mathrm{HO}-\ \mathrm{CH_2}-\mathrm{CH_2}-\mathrm{OH}) +$





dacron

Ethylene glycol and terephthalic acid on condensation give Dacron.

255 **(a)**

Terylene is condensation polymer of ethylene glycol and terephthalic acid.

256 **(a)**

Buna-S

257 **(b)**

Cotton, hemp, jute, remie are natural fibres obtained from cellulose.

258 **(d)**

All options one correct